REMARKS

Claims 1, 3, 6-15, 17-20 and 23-25 remain pending in the application, claims 2, 4, 5, 16 and 21-22 having been canceled. Independent claims 1 and 17 have been carefully amended and reconsideration is courteously requested.

More particularly, independent claims 1 and 17 have now been limited to a preferred embodiment of the invention that involves a transfer tray or indirect bonding tray. This embodiment is an advantage because a plurality of orthodontic appliances can be connected to a plurality of teeth at essentially the same time when the tray is placed over the patient's dental arch.

The present invention as set out in amended claim 1 offers significant advantages to the orthodontic practitioner that are neither taught nor suggested by the prior art of record.

It is believed that one key to commercial success of a transfer tray is the ability to deliver to the practitioner an apparatus that consistently provides superior results for each patient. If, for example, one of the brackets placed by a transfer tray becomes inadvertently detached from the patient's tooth during the course of treatment due to a weak bond to the tooth, the patient must then return to the practitioner's office for replacement of the appliance before full treatment is resumed. Such an occurrence represents a nuisance both in terms of time and expense to the practitioner as well as to the patient.

The precise placement of the appliance in the patient's tooth is also important. If, for example, the appliance is not placed in a desired location, the practitioner may need to resort to bending of the archwire or repositioning of the appliance. Again, these options represent a significant nuisance in terms of time and expense.

The present invention as set out in amended claim 1 overcomes the disadvantages noted above by provision of a transfer tray with a plurality of appliances, wherein each appliance has a base with a contour that is a replica of a contour of a portion of the patient's tooth structure. In addition, a bonding composition is on the base of each appliance for bonding the appliance to the patient's tooth structure. The transfer tray, the plurality of appliances and the bonding composition are received in a chamber of a container for convenient and efficient use by the practitioner when desired.

The patent to Doyle, U.S. No. 5,863,198 describes a bracket placement jig for a single appliance. This reference also describes that an adhesive pad 158 may be applied to bracket 156, using positioning brace 154 to maintain jig 152 in a fixed position within a respective packaging compartment (see, e.g., column 7, lines 31-52).

However, the provision of a container having multiple compartments as described in the '198 patent, each containing a single bracket and a corresponding single jig, is a disadvantage in that each bracket is affixed to a respective tooth in individual fashion. There is no teaching that multiple brackets can be bonded to multiple teeth simultaneously. Moreover, the brackets are not oriented with respect to other brackets during the bonding procedure. As such, the likelihood of positioning errors from one bracket to the next is increased.

The provision of multiple compartments as described in the '198 patent and for each individual jig and bracket also increases the difficulty of obtaining an effective seal between the atmosphere and the adhesive. If the seal is ineffective, airborne contaminates may contact the adhesive and render it unsatisfactory and unable to properly bond the appliance to the tooth for the entire course of treatment.

Additionally, the '198 Doyle patent does not describe an orthodontic appliance that has a base with a contour that is a replica of the contour of a portion of the patient's tooth. In contrast, it appears that the base of each bracket in this reference is not a custom base but instead a standard base used with multiple patients. See, for example, column 3, lines 60-62 where it is mentioned that the pad and support portions of each bracket are preferably comprised of a high strength, inert material such as stainless steel. Also, see column 8, lines 51-54 where it is mentioned that "[t]he placement jig is adapted for use with conventional, off-the-shelf orthodontic appliance brackets. . . ". There is no teaching of a custom base or of an orthodontic bracket provided with a base having a contour that is a replica of a contour of a portion of the patient's tooth structure.

The precise, mating contour between the base of the appliances of applicant's invention and the respective portion of the patient's tooth structure is a significant advantage in that a close, mating fit is attained. As a result, a thinner layer of adhesive can be used, and the filler content of the adhesive can be less than previously expected. A thinner layer of adhesive can lead to improved bond strength and reduce the chance of spontaneous debonding. In addition, a reduced filler loading can facilitate clean-up of adhesive flash once the appliance has been bonded to the tooth.

The patent to Sondhi et al., U.S. No. 5,971,754, describes an indirect bonding method and adhesive for orthodontic treatment, wherein a transfer tray delivers a plurality of orthodontic appliances to the patient's tooth structure. However, there is no suggestion in this patent that a bonding composition should be applied in advance to the base of each appliance connected to the transfer tray and subsequently placed in a chamber of a container for shipment to the practitioner. Instead, the bonding adhesive described in the '754 patent is applied to the appliances only during the course of a bonding procedure in the practitioner's office.

For example, in column 8, lines 24-55, it is indicated that the bonding adhesive is applied to the hardened adhesive 18 and/or selected areas of the patient's teeth once the patient has returned to the office and after the etching solution has remained on selected tooth structure for a period of time. There is no teaching in the '754 patent that the bonding composition be applied to the orthodontic appliances ahead of time and then placed in a chamber of a container for later use.

The disclosure of the '754 patent would tend to lead one skilled in the art away from the concepts set out in applicant's claim 1. For example, the adhesive that is exemplified in the '754 patent may degrade under the influences of atmospheric temperature if applied to the appliances ahead of time by the manufacturer and then shipped to the practitioner for later use. This adhesive is also relatively volatile, which would discourage someone from applying it to appliances as set out in applicant's claims.

Another significant advantage of the present invention is that a "hydraulic interlock" between the transfer tray and the patient's tooth structure can be avoided. Oftentimes, when using transfer trays, excess adhesive applied to the base of the appliances can hinder proper seating of the transfer tray because the excess adhesive cannot escape. As a result, the appliances and the tray essentially float on a layer of adhesive, resulting in possible malpositioned appliances and also possibly increasing the thickness of the layer of adhesive between the appliance and the tooth. This thicker layer may weaken the ultimate bond strength, presenting the disadvantages set out above.

The apparatus set out in applicant's amended claim 1 can be constructed by the manufacturer with careful attention to proper quantities of bonding composition on the base of each appliance. Excess bonding composition can be avoided, resulting in a closer and stronger bond of the appliances to the teeth. The reduction of excess adhesive also helps to reduce the practitioner's time in cleaning excess adhesive from the patient's tooth surface once the transfer tray has been removed from the patient's mouth.

The remarks set out above in connection with claim 1 apply to the remaining claims as well, including independent claim 17. It is believed that all of the claims represent novel subject matter that is not taught nor suggested by any of the references of record. Accordingly, reconsideration of the application and issuance of a Notice of Allowance are courteously solicited.

Respectfully submitted,

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